The Maumee River – Yesterday, today, and tomorrow

By

Donna N. Myers, U.S. Geological Survey,

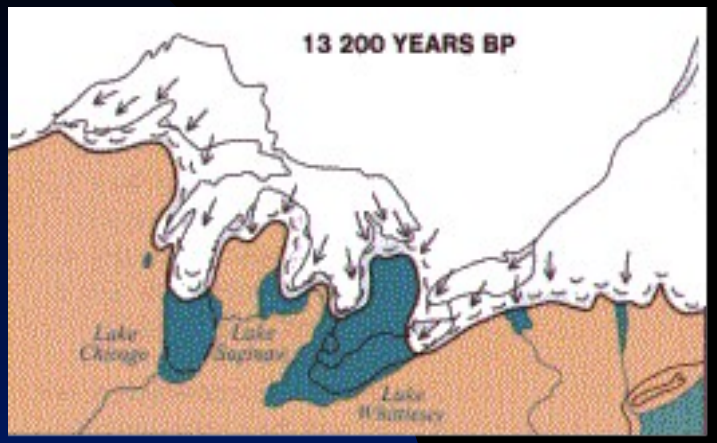
Great Lakes Program Coordinator

Yesterday - History of water resources development

Today – Status of the resource

Tomorrow - Future challenges

From Gift of the Glacier to Frontier land



Source: Great Lakes Information Network

13,000 years before present

Source: EPA and Environment Canada, 1995

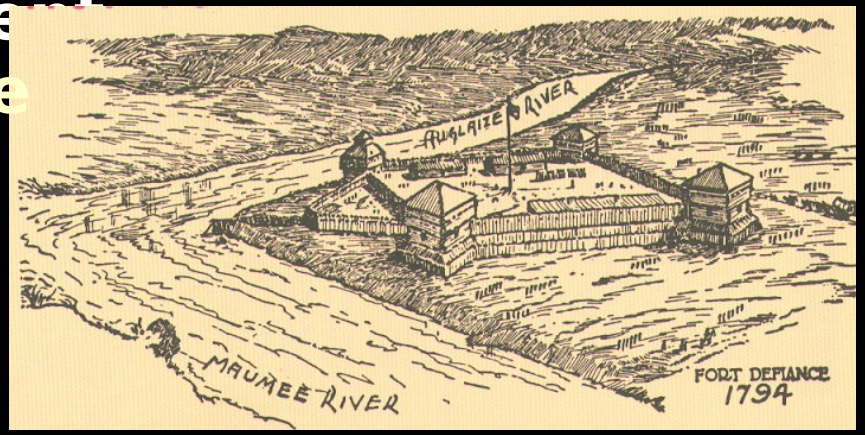
1688 map of New France

Presettlement (1794-95)

- Establishment of Fort Defiance and Battle of Fallen Timbers. “Mad” Anthony Wayne defeated Chief Little Turtle on a bluff above the north bank of the Maumee River

- Treaty of Green Ville signed under which the Indian tribes surrendered their claims to most of Ohio leading the way to settlement

Ft. Defiance
1794



1814 –After the War of 1812, settlers came to farm the rich soils of northwestern Ohio but were impeded by the Black Swamp. Lima Ohio was named after Lima Peru commemorating the great quantities of quinine bark imported from South America as a cure for swamp fever

1825 – U.S. Army Corps of Engineers begins to study Ohio harbors on Lake Erie and to begin improvements

Port of Toledo,

1800's

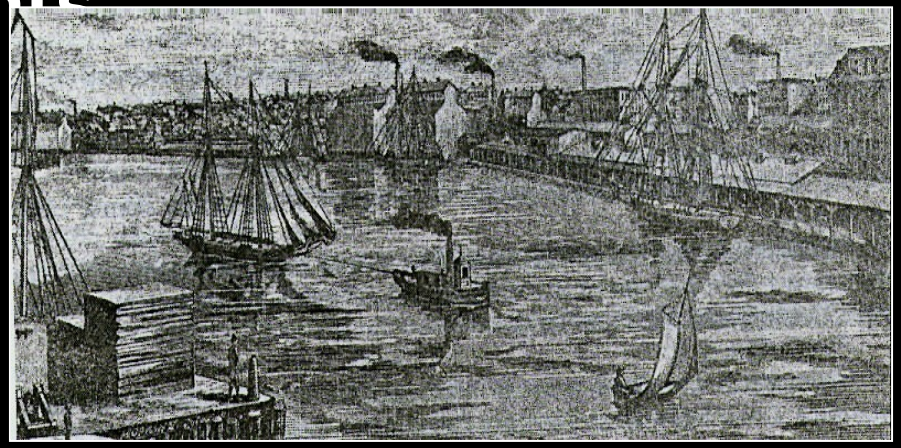
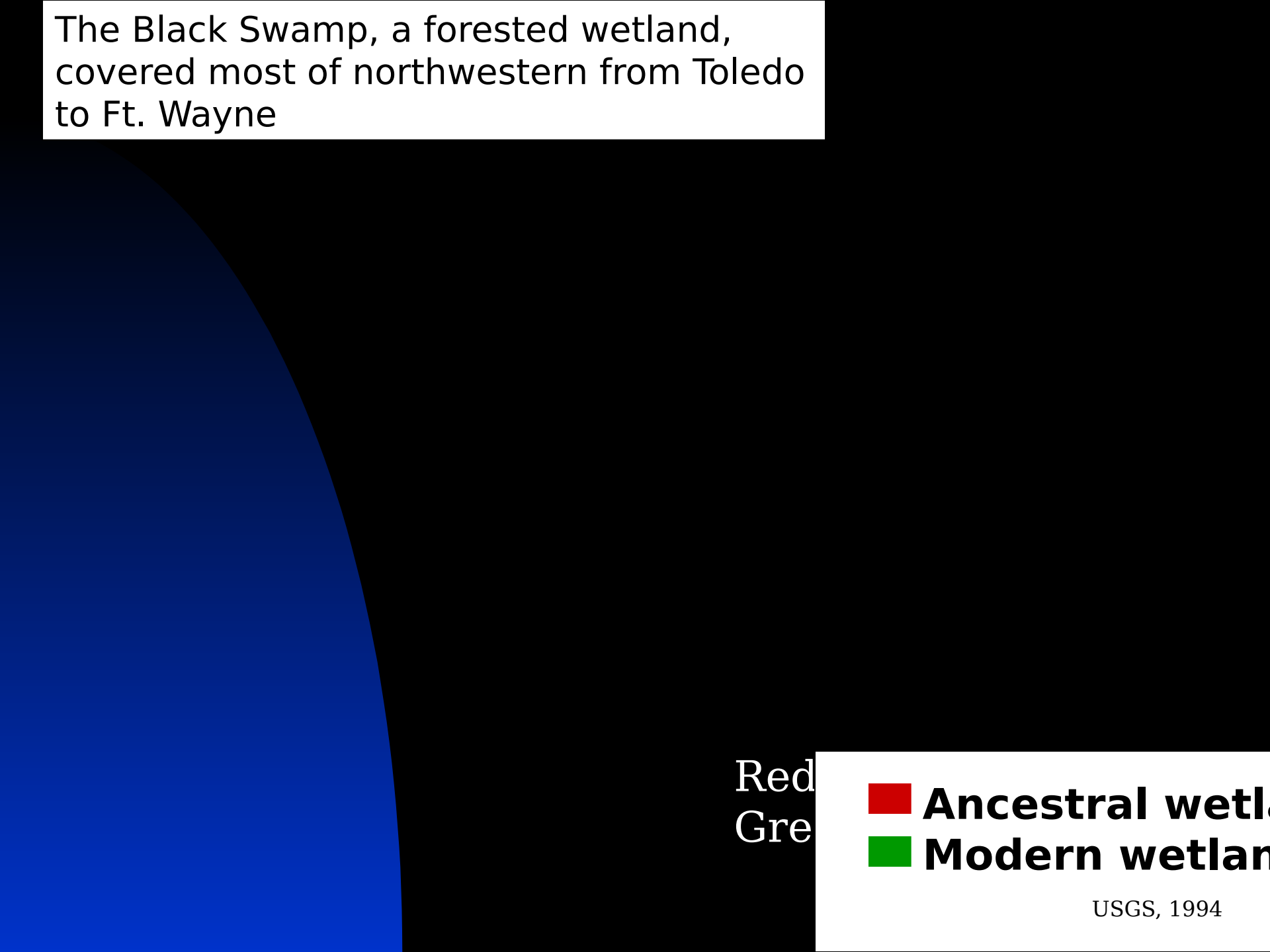


Photo from Ohio Water Firsts, v. 1, copyright 1985

The Black Swamp, a forested wetland, covered most of northwestern from Toledo to Ft. Wayne



1837 - Creation of Grand Lake St. Marys, Lake Lorami, and Indian Lake to feed the Miami-Erie and Wabash-Erie Canals

1843 to 1845 – Opening of the Miami-Erie and Wabash-Erie canals

Photo from Photo album of Ohio's canal era, copyright 1992

Yesterday

Photo from USGS

Toda

1850 - Logging and drainage begins to remove the forest of the Black Swamp.

- **Toledo becomes the largest port in Ohio to accommodate shipment of logs overseas.**

1866 – Rivers and Harbors Act helps to fund development of the Port of Toledo

"Millions of feet have been taken from the county down the canals and the Maumee and Auglaize Rivers and thence onward to the Eastern markets." –from "A history of northwest Ohio," Vol. 1

Photo from Photo album of Ohio's canal era,

1879 – the Black Swamp is half cleared of trees. Construction of the drainage ditch, the Jackson Cut Off is completed . This ditch drained 30,000 acres in the Upper Portage River and diverted the water nine miles to the Maumee River Basin.

1885 - The first giant oil and gas field in North America was discovered in northwest Ohio under Grand Lake St. Marys leading to the development of Lima and Findlay

1898 – First streamflow measurements on the Maumee River at Waterville.

1900 – Most of the Black Swamp is cleared and drained.

1913 – Most of t

Canals close

Ditch construction In Van Wert County 1930's

Photo from Ohio Department of Natural Resources, 1960

Floods and droughts

Droughts

- 1930-37 (most severe on record)
- 1952-56
- 1959-68 (severe in northwest Ohio)

Floods

- 1913 (most severe on record)
- 1943, 1950, 1959

1941 – Creation of Soil and Water Conservation Districts in Ohio

1949 – Creation of Ohio Department of Natural Resources

Ohio DNR publishes water development plans a inventories for the Maumee River Basin and No Ohio (1960, 1967, 1970, and 1986)

Ohio DNR Water inventory (1960)

Contents

- Area and economy (resources, population, industry)
- Water supply (lakes, streams, ground water, quality, pollution)
- Water Use (sources, municipal, industrial, recreation
- Flood Problems (history, urban, rural, zoning, redevelopment
- Watershed management (drainage, erosion, soil conservation

Ohio DNR Water Development Plans

(1967, 1970, 1986)

Contents

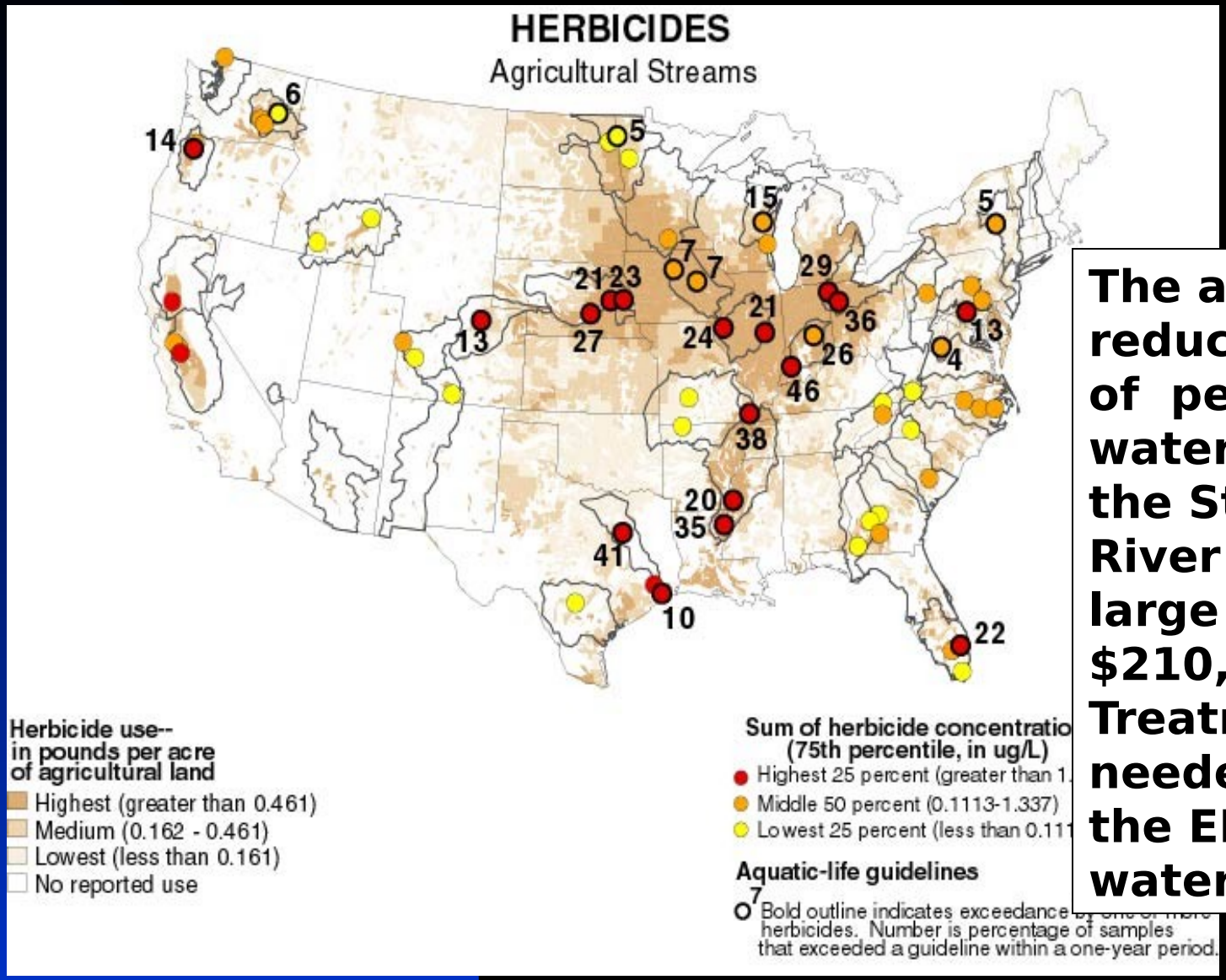
- Water Supply
- Water Quality Control
- Flood Control
- Water Recreation
- Land and Soil Management
- Fiscal and legal requirements

1960 to today – The "Green Revolution" in agriculture fosters the use of intensive cultivation practices, new pesticides, and inorganic fertilizers.

Water quality concerns From nonpoint sources of Pollution rise in the 1980's and

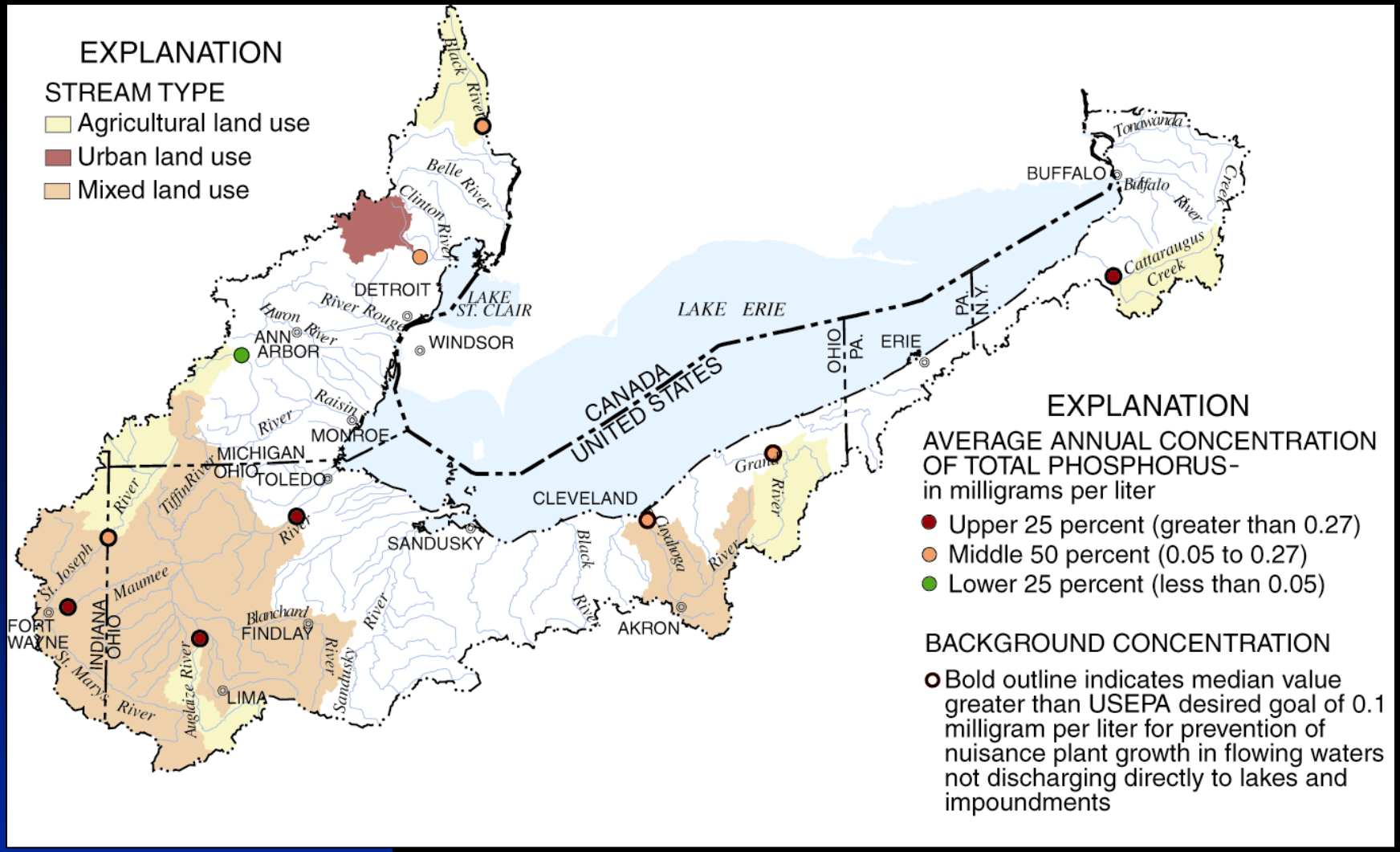
Photos from Ohio Department of Natural Resources

Herbicide levels are among the highest in the nation



The annual cost to reduce the levels of pesticides in water taken from the St. Joseph River by one large city was $210,000 in 1999. Treatment was needed to meet the EPA's drinking water standards.

Source: USGS, 2000

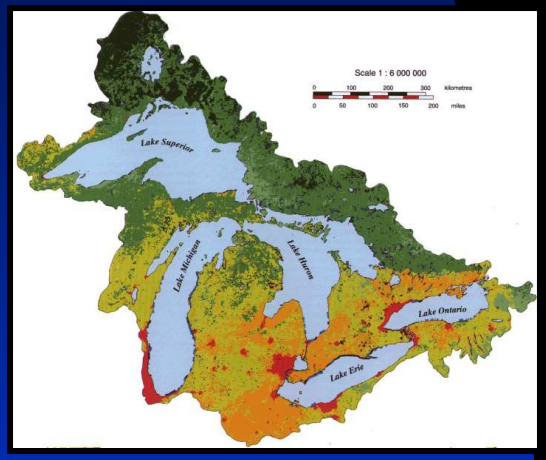


Phosphorus concentrations at 8 of 10 sampling sites were in the upper 25 percent of streams sampled nationwide from 1991-98. Trends are downward from 1975-1995

Source: USGS, 2000

1972 – Establishment of

- U.S. EPA
- Ohio EPA
- US and Canada sign Great Lakes Water Quality Agreement. Amendments followed in 1978 and 1987



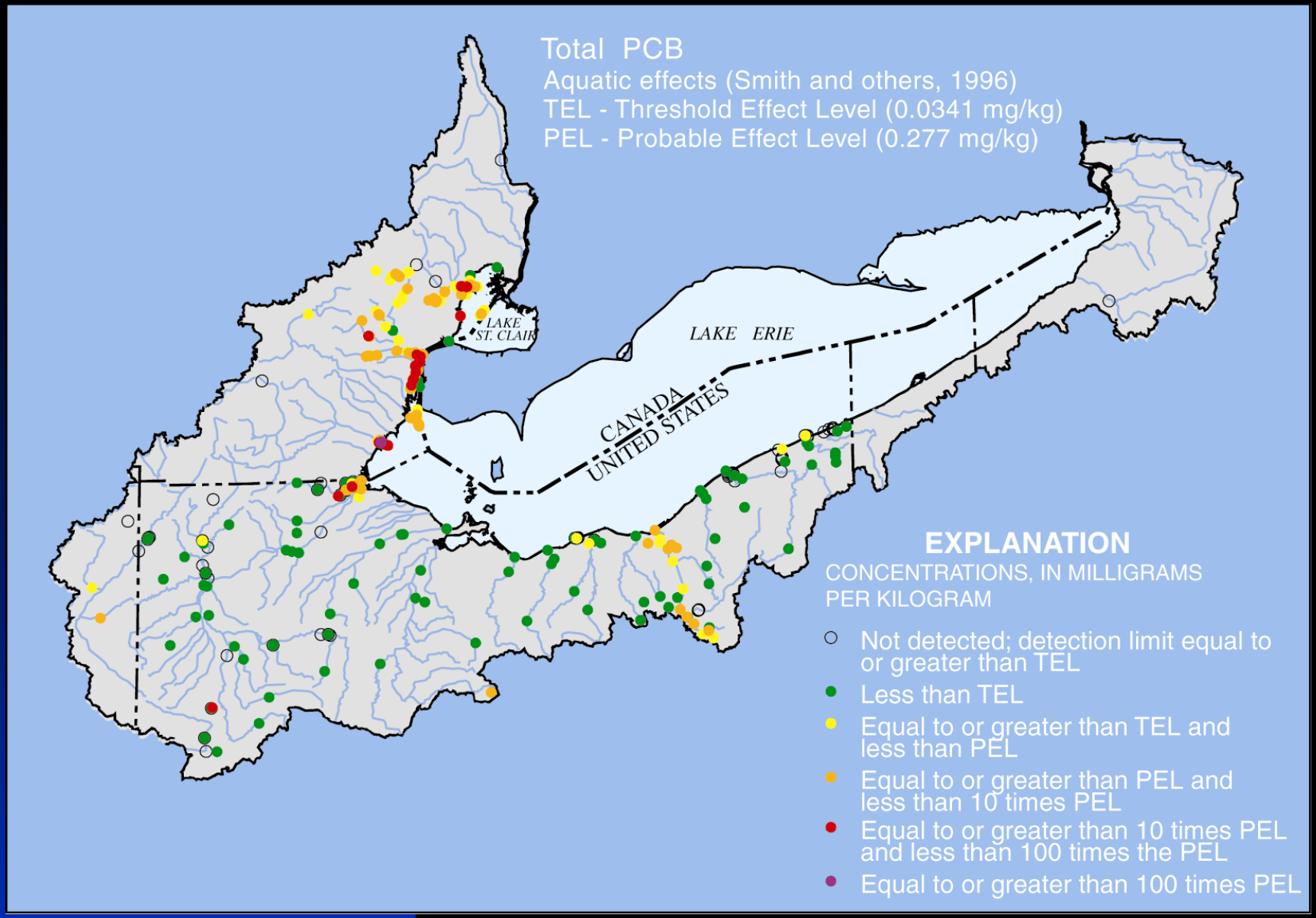
Source: EPA and Environment Canada

1978 – Amendment to the Great Lakes Water Quality Agreement (GLWQA) between the United States and Canada to control nutrient enrichment of Lake Erie and other lakes. Phosphorus is identified for control

Photo from Ohio Lake Erie Commission

Source: EPA and Environment Canada

1987 – Amendment to the GLWQA create the 43 Areas of Concern including the Maumee and Ottawa River Remedial Action Plans


Total PCB
Aquatic effects (Smith and others, 1996)
TEL - Threshold Effect Level (0.0341 mg/kg)
PEL - Probable Effect Level (0.277 mg/kg)
LAKE ST. CLAIR
LAKE ERIE
CANADA
UNITED STATES
EXPLANATION
CONCENTRATIONS, IN MILLIGRAMS PER KILOGRAM
Not detected; detection limit equal to or greater than TEL
Less than TEL
Equal to or greater than TEL and less than PEL
Equal to or greater than PEL and less than 10 times PEL
Equal to or greater than 10 times PEL and less than 100 times the PEL
Equal to or greater than 100 times PEL

The Maumee and Ottawa Rivers are Areas of Concern with

Source: USGS,

1990's – Water issues persist in the Basin giving rise to concerns by local governments

Dredging sediment in Maumee Bay

Photo from Ohio Lake Erie Commission

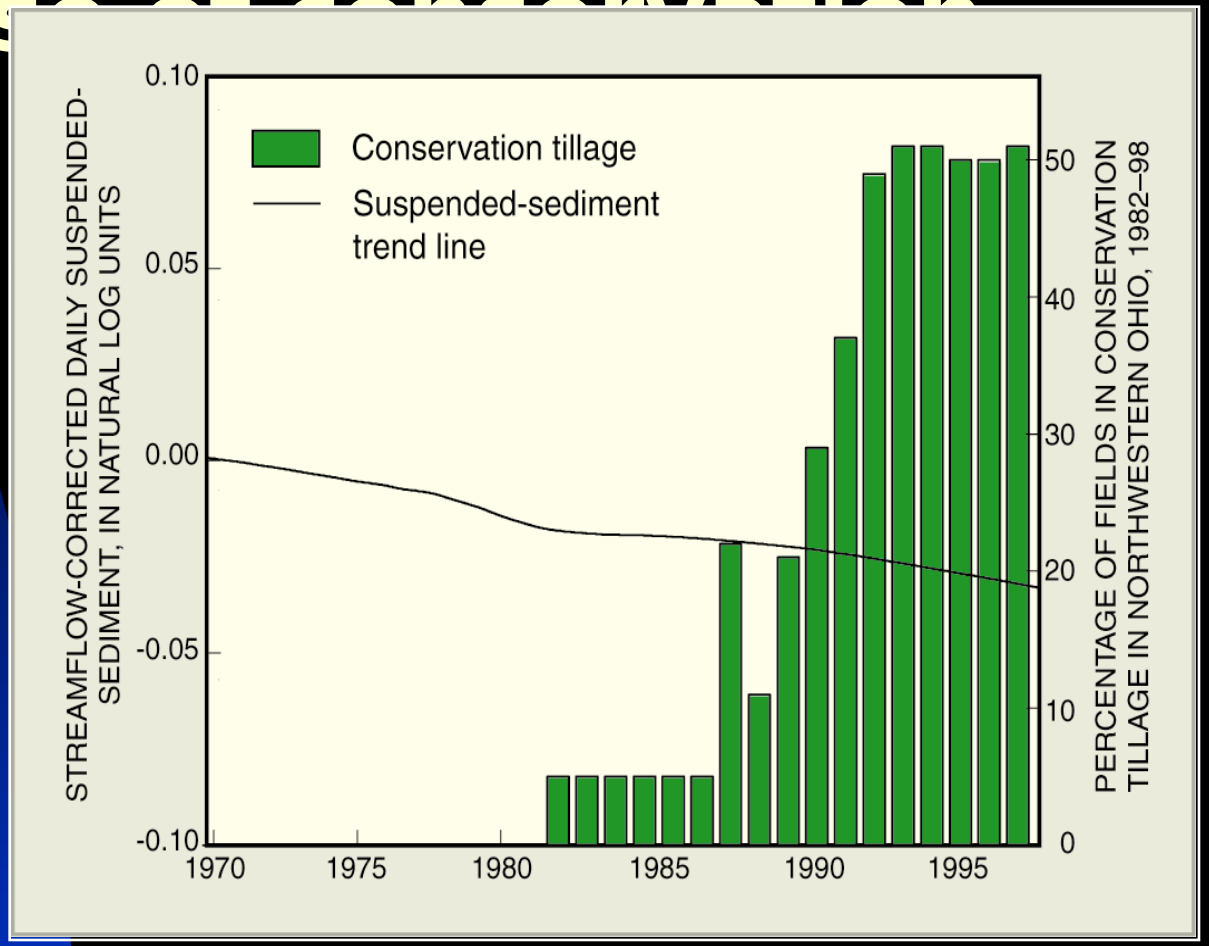
1982 to 1998 – Farmers use of conservation tillage to improve water quality grows to about 50 percent of all fields in northwestern Ohio.

1998 to today – Farmers begin to use vegetated buffer strips along waterways to improve water quality.

Source: Photos from Natural Resources

Maumee River sediment downward trends resulting from us[illegible] tillage,

1970-9[illegible]



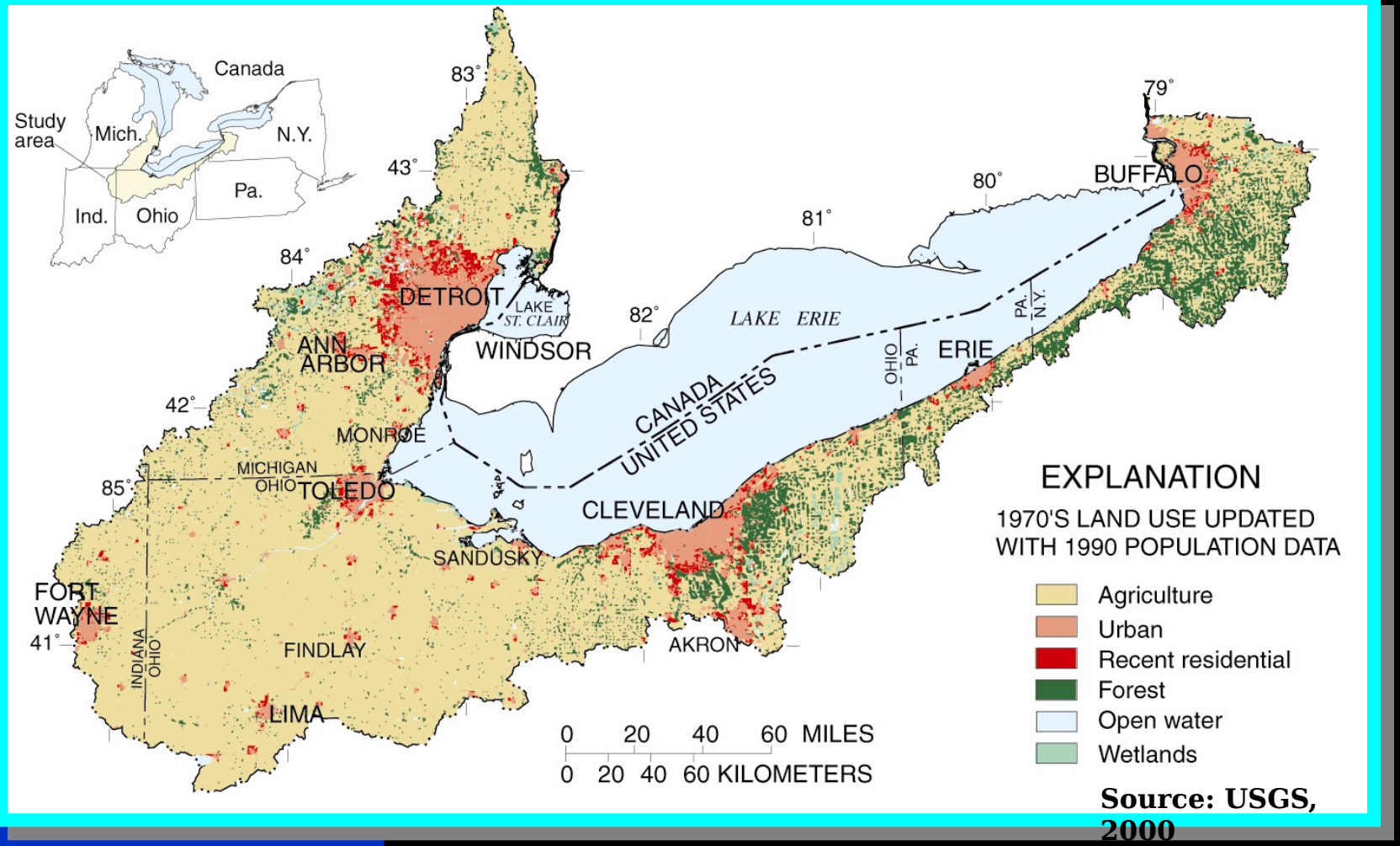
Source: USGS, 2000

2002 - 2020

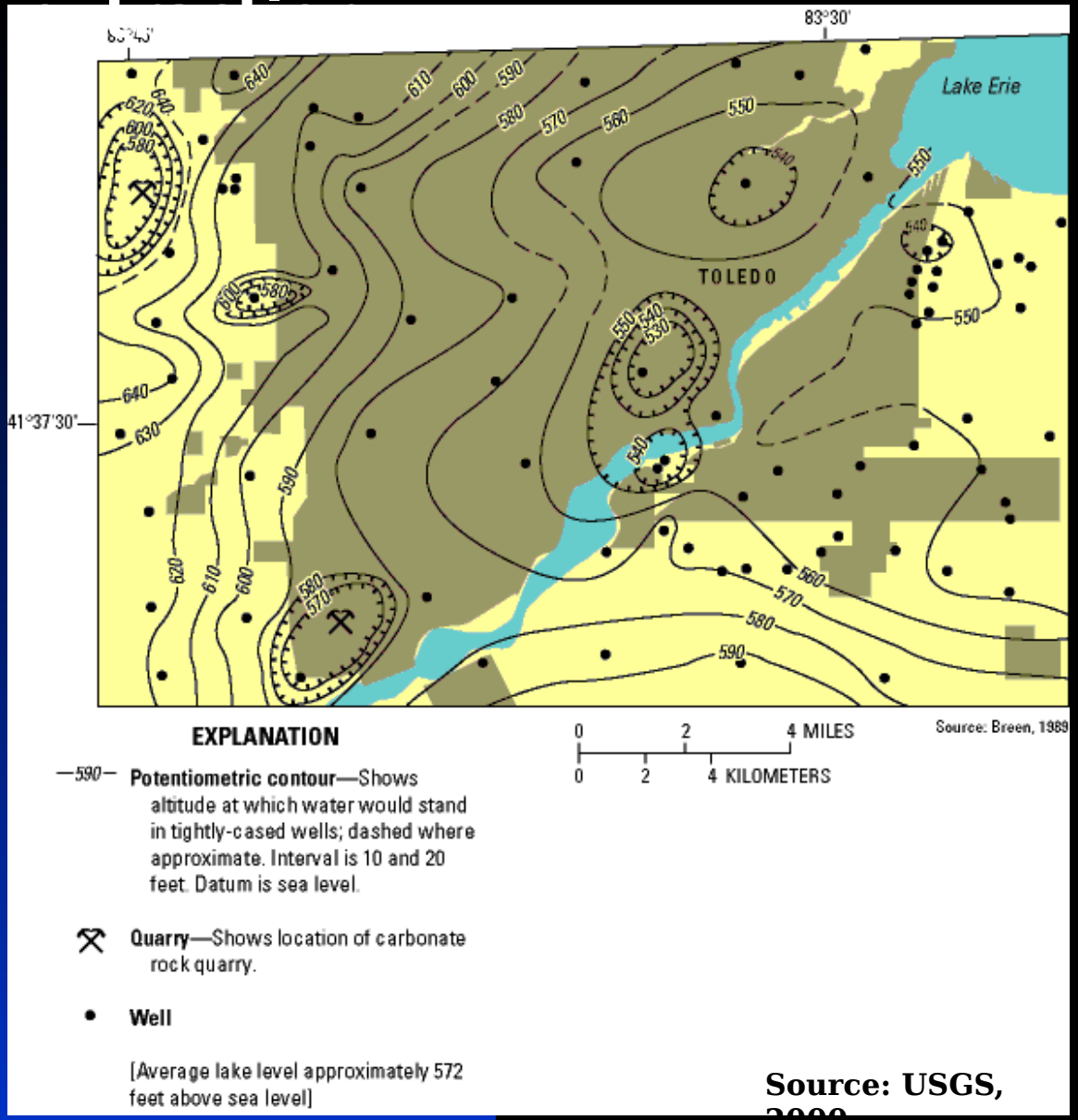
Emerging issues affecting water resources –

- **Too much water in some places and not enough water in other places**
- **Water quality concerns**

Land is about 90 percent developed into agricultural or urban uses. Land use influences water quality, flow, and



Ground water depletion may become an issue with increasing demand for withdrawal and


83°30'
Lake Erie
TOLEDO
41°37'30"
EXPLANATION
0 2 4 MILES
0 2 4 KILOMETERS
Source: Breen, 1989
590 Potentiometric contour—Shows altitude at which water would stand in tightly-cased wells; dashed where approximate. Interval is 10 and 20 feet. Datum is sea level.
Quarry—Shows location of carbonate rock quarry.
Well
[Average lake level approximately 572 feet above sea level]

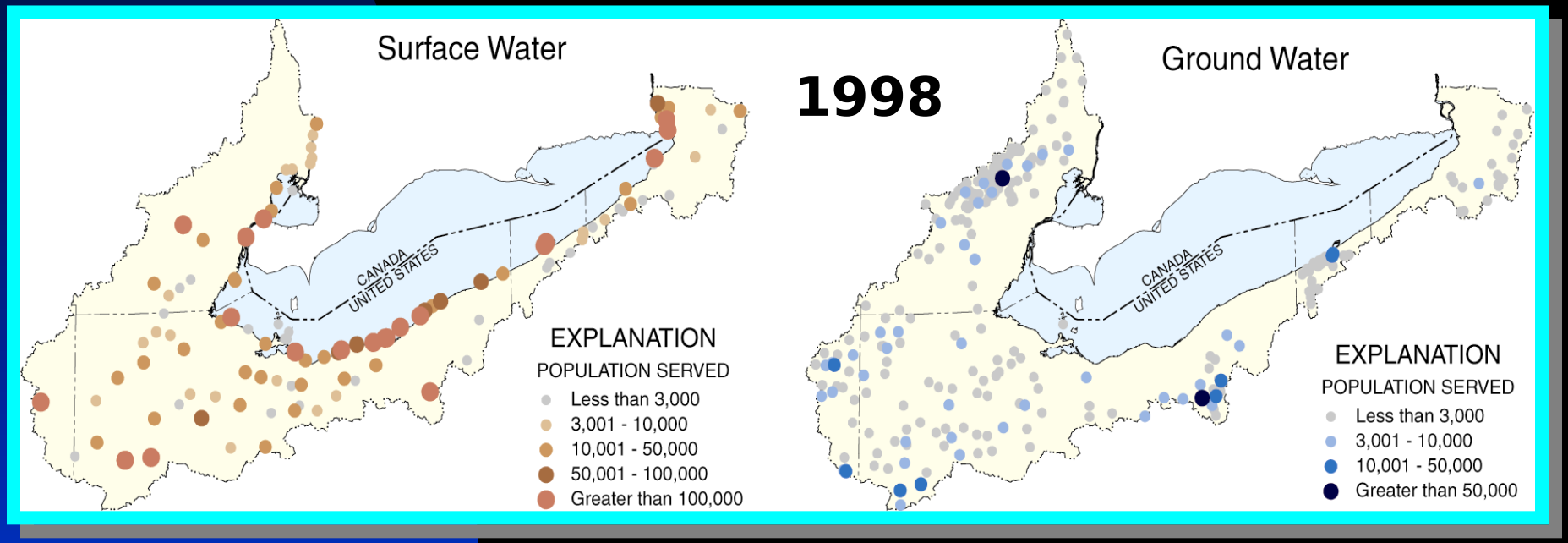
Elevation of ground water in the carbonate aquifer near Toledo, Ohio, July 1986.

Source: USGS, 2000

Photo from USGS

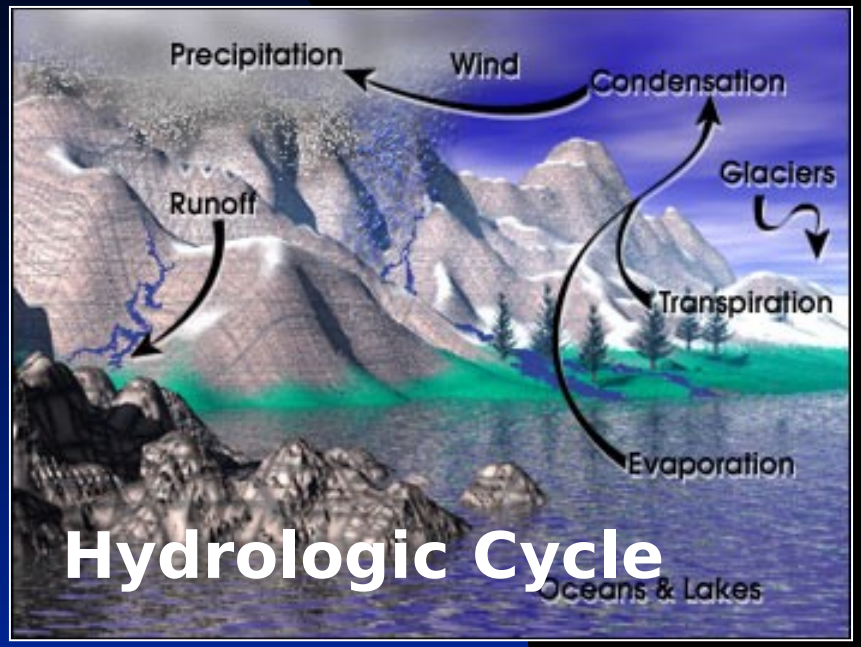
Ft Wayne Public Water Supply intake on the St. Joseph River near the source of the Maumee River

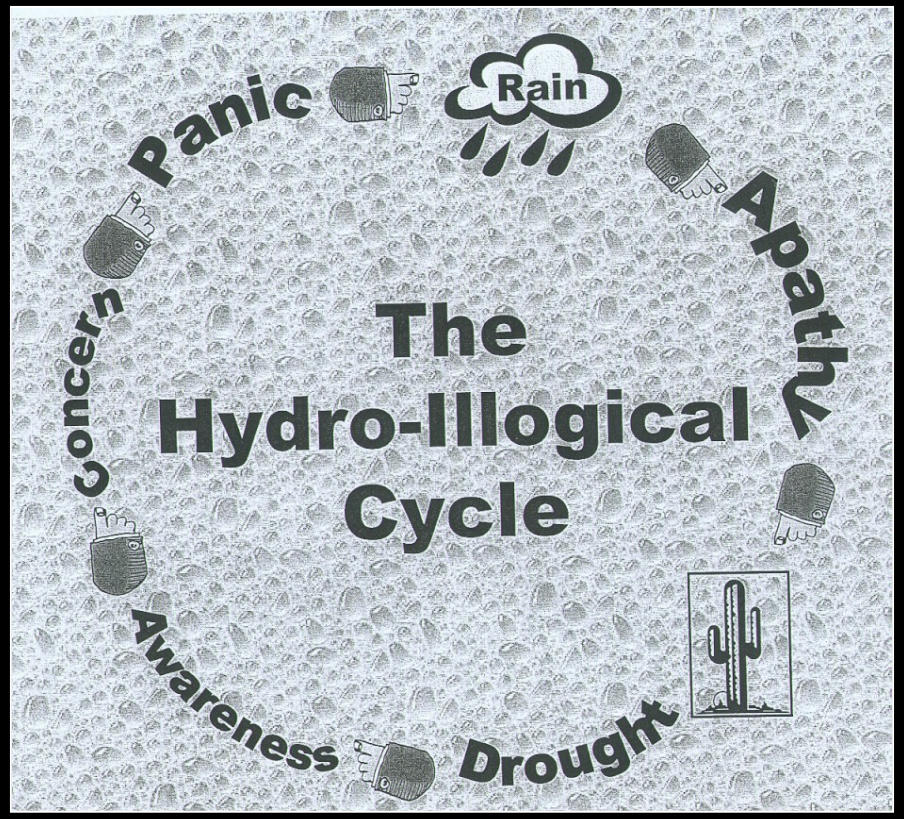
Surface and groundwater supplies in 1998



Source: USGS, 2000

Challenge: Can we break the Hy Cycle?





Source: Metcalf & Eddy